Online Proceedings

Poster Session 1

MGH 206, Easel 166

11:00 AM to 1:00 PM

The Effect of A Fish-Bearing Hatchery's Effluent on Stream Water Quality

Marina Latimer, Sophomore, Marine Biology, Design, Grays Harbor Coll
Mentor: Amanda Lyn Gunn, Science and Math Division, Grays Harbor College

A hatchery's purpose is to supplement falling populations of wild fish, mitigating human impact. However, the effect operating a stream-based hatchery has on the immediate stream environment is not well understood. Varied hatchery designs make it difficult to find a consistent way of assessing an establishment. This project used the idea that consistency is key to evaluate the impact hatcheries made by examining water of the the influent and effluent flow. Water was sampled from where it entered, transitioned, and exited three different fish-bearing hatcheries. Hatcheries were classified into three general water-system types, gravity-fed, spring-fed, and flow-through. Water status was evaluated by measuring electric current, dissolved oxygen, pH, temperature, and bacterial content. In addition to unique location characteristics, containment mitigation measures and extenuating circumstances were considered when evaluating the data. The results showed the trend of influent to effluent water in all three hatcheries increased in temperature while the levels of dissolved oxygen, electric current, and pH decreased. Similar result trends were also found between alike water-system types, although with the small sample results are inconclusive. This study is not meant to be a stand alone. With the inclusion of more locations the data will begin to form an averaged scale which could be referenced for the effectiveness of certain hatchery designs and contaminant mitigation techniques. Having this data-set would eventually serve as a resource for future hatchery construction projects.

Poster Session 1

MGH 206, Easel 167

11:00 AM to 1:00 PM

Microbiome Analysis of Human Impacts on Alder and Fry Creek

Lauren Thompson, Sophomore, Marine Biology, Grays Harbor Coll
Maddie Thompson, Sophomore, Marine Biology, Grays Harbor Coll
Mentor: Amanda Lyn Gunn, Science and Math Division, Grays Harbor College

Pollution from human influences is a growing problem in the Chehalis River and tributaries causing deleterious effects on stream health. Stream microbiomes are composed of diverse collection of microbes that play an important role in keeping the surrounding riparian zones and life within the streams healthy and thriving. Stream water has been facing a decline in quality from the leading cause of pollution from agriculture and manufacturer run-offs. Although there have been many studies relating to run-off pollution affecting streams, there are few in-depth studies done on the taxonomy and functionality of microbes in urban water ecosystems, so it is important for this to be further investigated. With the use of 16s rRNA sequencing, each sample site presents two years of data included to indicate differences both by season (Fall, Summer) and sample site. At the phylum level, every season consists of a primary microbial signature shared amongst the sites. These phyla are *Proteobacteria*, *Bacteroidetes*, *Actinobacteria*, *Firmicutes*, *Verrucomicrobia*, and *Tenericutes*. From the family data, common to nearly all sites are the *Flavobacteriaceae*, *Comamonadaceae*, and *Oxalobacteraceae*. Families prevalent at many sites in various combinations include *Flexibacteraceae*, *Crenotrichaceae*, *Chitinophagaceae*, and *Verrucobacteraceae*. This project presents a two-year microbiome analysis of Alder and Fry Creek to develop trends for the seasonal variation in urban water ecosystems due to human impacts.

Session 1E

Animal Behavior, Ecology, and Evolution

Session Moderator: Luke Tornabene, School of Aquatic and Fishery Sciences and the Burke Museum of Natural History and Culture

MGH 231

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Co-Evolution of Cleaning and Morphology in Caribbean Neon Gobies

Jonathan Michael Huie, Senior, Marine Biology, Aquatic & Fishery Sciences

Levinson Emerging Scholar, Mary Gates Scholar

Mentor: Luke Tornabene, School of Aquatic and Fishery Sciences and the Burke Museum of Natural History and Culture

Cleaning is a mutually beneficial relationship, where the cleaner removes and consumes ectoparasites from its clients. Among fishes, the cleaning behavior has evolved several times as a juvenile or facultative feeding strategy, and is often lost in adults. However, a minority of taxa clean almost exclusively across their ontogeny (obligate cleaners). The largest radiation of obligate cleaners are the Caribbean neon gobies (*Elacatinus*), that evolved with several congeneric non-cleaners, and in parallel with a closely related lineage of facultative cleaners (*Tigrigobius*). We suspect that obligate cleaning is a specialized trophic ecology tied to an equally specialized feeding morphology that facilitates improved cleaning performance. We coupled micro-CT scanning with the clearing and staining of museum specimens to compare several functional predictors of feeding performance between cleaner gobies and non-cleaners in a phylogenetic context. We also used geometric morphometrics to compare relative changes in head shape and mouth orientation. Obligate cleaning evolved once, and is characterized by a specialized scraping dentition, stouter cranial features, and a more subterminal mouth position relative to non-cleaners. Meanwhile, facultative cleaning evolved at least 2-3 times, and while some species display similar tooth morphologies as the obligate cleaners, they share more in common with non-cleaners. Obligate cleaners also exhibit fewer sexual dimorphic differences, suggesting that the demand for an efficient cleaning morphology trumps sexual selection.